

FACILE SYNTHESIS OF NOVEL PHOTOLUMINESCENT ZINC OXIDE MICRO AND NANOPENCILS

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RESULTS

A single step solvent-, catalyst-, template-free synthesis process to prepare photoluminescent [PL] pencils of ZnO either in micro or in nanosize is demonstrated. The thermolysis of Zn acetate dihydrate [ZAD] precursor in a closed stainless steel reactor at 700°C under *autogenic* pressure [6.5 MPa], yielded carbon spheres decorated ZnO micropencils [ZM]. The ZM have novel room temperature PL with well defined emission peaks at the green, yellow, orange and red regions of the visible spectra while suppressing the blue region. On the contrary, the thermolysis of ZAD in a closed stainless steel reactor at 700°C with *released* pressure yielded uniformly carbon coated ZnO nanopencils [ZN], Figure 1a and b. The coated carbon in ZN quenches the complete UV-Vis PL, however after annealing ZN at 600 °C/2h in air, the UV PL is dominant and the Vis PL is suppressed. The insight on the reaction mechanism is gained through *in situ* mass spectrometry measurements. The as-prepared ZM and ZN have been systematically characterized to determine their morphology, structure and composition.

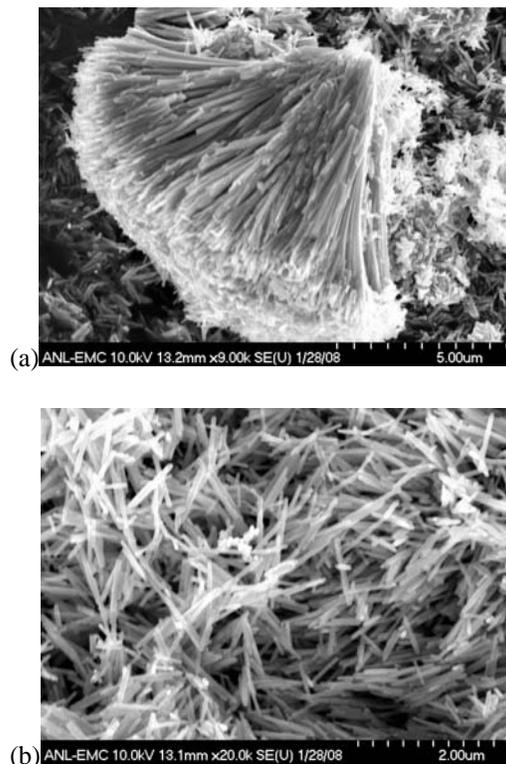


Figure 1. (a) Low resolution, (b) high resolution SEM of as grown ZnO nanopencils

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ACKNOWLEDGEMENTS

Work benefited from the use of the facilities at IPNS, CNM and EMC at ANL supported by the U.S. Department of Energy, Office of Science, Office of Basic Energy Sciences, under Contract No. DE-AC02-06CH11357 by UChicago Argonne, LLC.